

REMARKS/ARGUMENTS

Description of amendments

Claims 1-4 are now pending and under examination. Applicant has amended claims 1-4. No new matter has been added.

Rejection under 35 U.S.C. §112, second paragraph

Claims 1-4 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. According to the Examiner, the terms “internal radial gap” and “small” are not clear. For the following reasons, Applicants respectfully request reconsideration and withdrawal of the rejection.

The “internal radial gap” (or “internal radial clearance”) of a bearing is the total clearance between the bearing’s inner/outer rings and its rolling elements (see Attachment). The term is one of the most frequently used in the bearing art and is an important parameter in bearing design. Therefore, the term is perfectly clear to one with ordinary skill in the bearing art, and there is no need to define specifically the term in the specification.

The rejection based on the term “small” is rendered moot by the deletion of the word from the claims.

Rejection under 35 U.S.C. §103(a)

Claims 1-4 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nagai (U.S. Patent 5,501,530) in view of common knowledge in the art or in

view of design choice. For the following reasons, Applicants respectfully request reconsideration and withdrawal of the rejection.

Applicants' invention is directed to a motor for an information-processing device, which motor includes a bearing having inner and outer groove radius ratios within the ranges of 52% to 54% and 54% to 56%, respectively. Advantages of Applicants' invention include reduced wear and improved acoustic life for a bearing used in a motor for an information-processing device. In the prior art, as discussed in the first paragraph on page 2 of the specification, the standard inner and outer groove radius ratios for such a bearing were 52% and 53%, respectively. It is apparent that the beneficial results of Applicants' invention were not expected in the prior art.

Nagai discloses a double-row ball bearing for a vehicle wheel, while Applicants claim a bearing used in a motor for an information-processing device. Compared with a bearing used in a motor for an information-processing device, the Nagai bearing is much larger and operates at a much lower speed. For example, the diameter of a bearing for a magnetic disc drive can be a few millimeters, while the Nagai's bearing, which is used to support a vehicle wheel, can be many times larger. Further, the operating speed of a bearing used in an information-processing device can be many times greater than that of the Nagai bearing. Therefore, the operating conditions for the Nagai bearing and the claimed bearing are completely different, and one with ordinary skill in the art would not have contemplated using the Nagai bearing in a motor for an

information-processing device. Most importantly, using the Nagai bearing in a motor for an information-processing device would be against the standard practice in the industry (see the discussion on Japan Industrial Standard JIS1519 in the first paragraph on page 2 of the specification). In other words, the standard practice then (i.e. the prior art) teaches away from using the Nagai bearing in a motor for an information-processing device. Therefore, the obviousness rejection has been rebutted. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997) (a prima facie case of obviousness may be rebutted by showing that the art, in any material respect, teaches away from the claimed invention).

In conclusion, because Applicants' invention produces expected results and the prior art teaches away from the use of the Nagai bearing in a motor for an information-processing device, the obviousness rejection of claims 1-4 is improper.

In light of the foregoing remarks, this application is considered to be in condition for allowance, and early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and

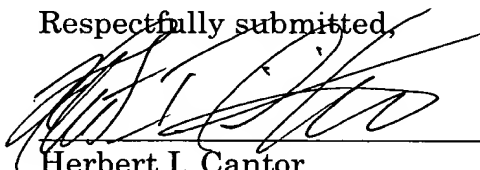
Application No. 09/957,462
Reply dated May 11, 2004
Response to Office Action dated February 11, 2004

please charge any deficiency in fees or credit any overpayments to Deposit

Account No. 05-1323 (CAM #038920.50453US).

May 11, 2004

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'H. Cantor', is written over a horizontal line.

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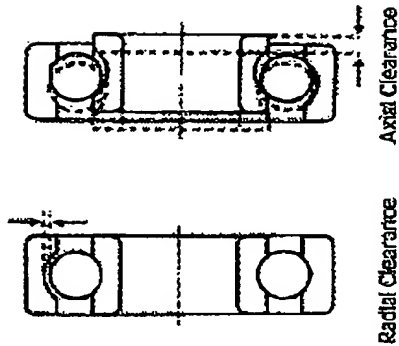


Bearing Handbook

- ☐ Types & Features
- ☐ Bearing Arrangements
- ☐ Loads & Life
- ☐ Limiting Speed
- ☐ Basic Dimensions & Part Numbering
- ☐ Tolerances & Accuracy
- ☐ Fits & Internal Clearances
- ☐ Load Conditions & Fits
- ☐ Recommended Fits
- ☐ Shafts and Inner Rings
- ☐ Housings and Outer Rings
- ☐ Bearing Internal Clearances
- ☐ Preload
- ☐ Design of Shafts & Housings
- ☐ Lubrication
- ☐ Bearing Materials
- ☐ Handling & Care

Bearing Internal Clearances

The internal clearance in rolling bearings in operation greatly influences bearing performance including fatigue life, vibration, noise, heat generation, etc. Consequently, the selection of the proper internal clearance is one of the most important tasks when choosing a bearing after the type and size have been determined. This bearing internal clearance is the combined clearances between the inner/outer rings and rolling elements. The radial and axial clearances are defined as the total amount that one ring can be displaced relative to the other in the radial and axial directions respectively.



To obtain accurate measurements, the clearance is generally measured by applying a specified measuring load on the bearing; therefore, the clearance (sometimes called "measured clearance" to make a distinction) is always slightly larger than the theoretical internal clearance (called "geometrical clearance" for radial bearings) by the amount of elastic deformation caused by the measuring load.

Therefore, the theoretical internal clearance may be obtained by correcting the measured clearance by the amount of elastic deformation. However, in the case of roller bearings this elastic deformation is negligibly small.

Radial Internal Clearances for Different Bearing Types

Bearing Types	
Deep Groove Ball Bearings	
Extra Small and Miniature Ball Bearings	
Magneto Bearings	
Self-Aligning Ball Bearings	With Cylindrical Bores

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	With Tapered Bores
Deep Groove Ball Bearings	
Cylindrical Roller Bearings	For Motors
Cylindrical Roller Bearings	With Cylindrical Bores
	With Cylindrical Bores (Matched)
	With Tapered Bores (Matched)
Spherical Roller Bearings	With Cylindrical Bores
	With Tapered Bores
Double-Row and Combined Tapered Roller Bearings	
Combined Angular Contact Ball Bearings ⁽¹⁾	
Four-Point Contact Ball Bearings ⁽¹⁾	

Note⁽¹⁾ Values given are axial clearances.

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